

Claims

Rule 1.26 29  
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(New) Agricultural bale equipment comprising:

a field position locator adapted to determine a location of the agricultural bale equipment in a field; and

a controller adapted to control an operation of the agricultural bale equipment responsive to the location of the agricultural bale equipment in the field.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a number of bales formed by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a size of bales formed by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a moisture content of bales formed by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a weight of bales formed by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a location of bales discharged in the field by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a distance traveled in the field by the agricultural bale equipment.

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X (New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a path traveled in the field by the agricultural bale equipment.

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(New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a contour of the field traveled by the agricultural bale equipment.

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(New) Agricultural bale equipment according to claim 1, wherein the controller controls the operation of the agricultural bale equipment by determining a size of the field traveled by the agricultural bale equipment.

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(New) Agricultural bale equipment according to claim 1, wherein the field position locator further comprises:

a global positioning satellite (GPS) receiver adapted to receive a plurality of input signals, transmitted by a plurality of satellites located around the earth, representative of the location of the agricultural bale equipment in the field.

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(New) Agricultural bale equipment according to claim 1, wherein the agricultural bale equipment further comprises a baler.

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(New) Agricultural bale equipment according to claim 1, wherein the agricultural bale equipment further comprises a bale accumulator.

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(New) Agricultural bale equipment according to claim 13, wherein the agricultural bale equipment further comprises:

a base module including a load bed adapted to receive a plurality of bales along a bale receiving axis and adapted to accumulate thereon the plurality of bales,

wherein the controller controls the operation of the agricultural bale equipment by the controlling the receipt and accumulation of the plurality of bales on the load bed.

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(New) Agricultural bale equipment according to claim 14, wherein the agricultural bale equipment further comprises:

a bale transfer module adapted to transfer at least one bale of the plurality of bales across the load bed along a bale transfer axis horizontally transverse to the bale receiving axis responsive to the plurality of bales being received on the load bed,

wherein the controller controls the receipt and accumulation of the plurality of bales on the load bed by controlling the bale transfer module.

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16. (New) Agricultural bale equipment according to claim 14, wherein the agricultural bale equipment further comprises:

a bale stacking module adapted to form at least one stack of bales, including at least two bales of the plurality of bales, along a bale stacking axis vertically transverse to the bale receiving axis responsive to the plurality of bales being received on the load bed,

wherein the controller controls the receipt and accumulation of the plurality of bales on the load bed by controlling the bale stacking module.

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17. (New) Agricultural bale equipment according to claim 14, wherein the agricultural bale equipment further comprises:

a bale arrangement control module adapted to arrange at least one bale of the plurality of bales on the load bed responsive to the plurality of bales being received on the load bed,

wherein the controller controls the receipt and accumulation of the plurality of bales on the load bed by controlling the bale arrangement control module.

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18. (New) Agricultural bale equipment according to claim 14, wherein the agricultural bale equipment further comprises:

a bale stabilization module adapted to stabilize at least one bale of the plurality of bales accumulated on the load bed,

wherein the controller controls the receipt and accumulation of the plurality of bales on the load bed by controlling the bale stabilization module.

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19. (New) Agricultural bale equipment according to claim 14, wherein the agricultural bale equipment further comprises:

a bale advancement module adapted to advance at least one bale of the plurality of bales along the bale receiving axis onto the load bed,

wherein the controller controls the receipt and accumulation of the plurality of bales on the load bed by controlling the bale advancement module.

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20. (New) Agricultural bale equipment according to claim 13, wherein the agricultural bale equipment further comprises:

a bale discharge module adapted to discharge at least one bale of a plurality of bales accumulated on a load bed to a ground surface,

wherein the controller controls the operation of the agricultural bale equipment by the controlling the bale discharge module.

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81. (New) Agricultural bale equipment according to claim 20, wherein the agricultural bale equipment further comprises:

a permissive bale discharge module adapted to discharge at least one bale of the plurality of bales accumulated on the load bed from a bale receiving portion of the load bed to the ground surface,

wherein the controller controls the bale discharge module by controlling the permissive bale discharge module.

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82. (New) Agricultural bale equipment according to claim 20, wherein the agricultural bale equipment further comprises:

B, a selective bale discharge module adapted to selectively discharge at least one bale of the plurality of bales accumulated on the load bed from the load bed to the ground surface,

wherein the controller controls the bale discharge module by controlling the selective bale discharge module.

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83. (New) Agricultural bale equipment according to claim 20, wherein the agricultural bale equipment further comprises:

a bale advancement module adapted to advance at least one bale of the plurality of bales along the bale receiving axis onto the load bed,

wherein the controller controls the bale discharge module by controlling the bale advancement module.

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84. (New) Agricultural bale equipment according to claim 20, wherein the agricultural bale equipment further comprises:

a bale speed control discharge module adapted to control a rate of speed at which at least one bale of the plurality of bales are discharged from the load bed to the ground surface,

wherein the controller controls the bale discharge module by controlling bale speed control discharge module.

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85. (New) Agricultural bale equipment according to claim 1, wherein the agricultural bale equipment further comprises:

a user interface module adapted to provide an interface between the agricultural bale equipment and a user,

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wherein the controller controls the operation of the agricultural bale equipment by controlling the user interface module.

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26. (New) A method for operating agricultural bale equipment comprising the steps of:  
determining a location of the agricultural bale equipment located in a field; and  
controlling an operation of the agricultural bale equipment responsive to the location  
of the agricultural bale equipment in the field.

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27. (New) A method for operating agricultural bale equipment according to claim 26,  
wherein the step of determining the location of the agricultural bale equipment in the field  
further comprises the steps of:  
receiving a plurality of input signals transmitted by a plurality of satellites located  
around earth; and  
processing the plurality of input signals to determine the location of the agricultural  
bale equipment in the field.

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28. (New) A method for operating agricultural bale equipment according to claim 26,  
wherein the step of determining the location of the agricultural bale equipment in the field  
further comprises the steps of:  
receiving an initialization signal indicative of a starting location of the agricultural  
bale equipment in the field;  
receiving an input signal from a compass;  
determining a distance traveled by the agricultural bale equipment in the field; and  
processing the initialization signal, the input signal from the compass and the distance  
traveled by the agricultural bale equipment in the field to determine the location of the  
agricultural bale equipment in the field.

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29. (New) A method for operating agricultural bale equipment according to claim 26,  
wherein the step of controlling the operation of the agricultural bale equipment further  
comprises the step of:  
receiving and accumulating a plurality of bales by the agricultural bale equipment.

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30. (New) A method for operating agricultural bale equipment according to claim 26,  
wherein the step of controlling the operation of the agricultural bale equipment further  
comprises the step of:  
discharging at least one bale of a plurality of bales by the agricultural bale equipment  
to a ground surface of the field.

51. (New) A method for operating agricultural bale equipment according to claim 30, further comprising the steps of:

- determining a present number of bales received and accumulated on the agricultural bale equipment;

- determining whether the present number of bales received and accumulated on the agricultural bale equipment is equal to or less than a predetermined bale accumulating capacity of the agricultural bale equipment;

- when it is determined that the present number of bales received and accumulated on the agricultural bale equipment is equal to the predetermined bale accumulating capacity of the agricultural bale equipment, then perform the step of:

  - determining whether the agricultural bale equipment is located in or has recently passed through at least one predetermined bale discharge zone located in the field (1135) responsive to the location of the agricultural bale equipment in the field;

  - when it is determined that the agricultural bale equipment is located in or has recently passed through the at least one predetermined bale discharge zone, then perform the step of:

    - discharging the present number of bales received and accumulated on the agricultural bale equipment to the ground surface in or near the at least one predetermined bale discharge zone;

  - when it is determined that the agricultural bale equipment is not located in or has not recently passed through the at least one predetermined bale discharge zone, then perform the steps of:

    - discharging some of the present number of bales received and accumulated on the agricultural bale equipment to the ground surface prior to reaching a next predetermined bale discharge zone to be reached by the agricultural bale equipment as the agricultural bale equipment travels a remaining distance from a present location of the agricultural bale equipment in the field to the next predetermined bale discharge zone responsive to the location of the agricultural bale equipment in the field and a location of the next predetermined bale discharge zone; and

    - continuing with the step of receiving and accumulating the plurality of bales on the agricultural bale equipment;

  - when it is determined that the present number of bales received and accumulated on the agricultural bale equipment is less than the predetermined bale accumulating capacity of the agricultural bale equipment, then perform the step of:

determining whether the agricultural bale equipment is located in or has recently passed through the at least one predetermined bale discharge zone;

when it is determined that the agricultural bale equipment is located in or has recently passed through the at least one predetermined bale discharge zone, then perform the step of:

discharging the present number of bales received and accumulated on the agricultural bale equipment from the agricultural bale equipment to the ground surface in or near the at least one predetermined bale discharge zone;

when it is determined that the agricultural bale equipment is not located in or has not recently passed through the at least one predetermined bale discharge zone, then continuing with the step of:

receiving and accumulating the plurality of bales on the agricultural bale equipment.

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32. (New) A method for operating agricultural bale equipment according to claim 31, further comprising the steps of:

determining a past distance traveled by the agricultural bale equipment in the field while the present number of bales were received and accumulated on the agricultural bale equipment; and

determining an average number of bales received and accumulated on the agricultural bale equipment over the past distance traveled by the agricultural bale equipment in the field responsive to the present number of bales received and accumulated on the agricultural bale equipment and the past distance traveled by the agricultural bale equipment in the field.

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33. (New) A method for operating agricultural bale equipment according to claim 32, wherein the step of discharging some of the present number of bales received and accumulated on the agricultural bale equipment to the ground surface prior to reaching the next predetermined bale discharge zone further comprises the steps of:

determining the remaining distance between the present location of the agricultural bale equipment in the field and the next predetermined bale discharge zone in the field to be reached by the agricultural bale equipment responsive to the location of the agricultural bale equipment in the field and the location of the next predetermined bale discharge zone in the field;



estimating a future number of bales to be received and accumulated on the agricultural bale equipment over the remaining distance between the present location of the agricultural bale equipment in the field and the next predetermined bale discharge zone to be reached by the agricultural bale equipment responsive to the average number of bales received and accumulated on the agricultural bale equipment over the past distance traveled by the agricultural bale equipment in the field and the remaining distance between the present location of the agricultural bale equipment in the field and the next predetermined bale discharge zone; and

discharging the estimated future number of bales to be received and accumulated on the agricultural bale equipment from the load bed to a ground surface prior to reaching the next predetermined bale discharge zone as the agricultural bale equipment travels the remaining distance from the present location of the agricultural bale equipment in the field to the next predetermined bale discharge zone.

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34. (New) A method for operating agricultural bale equipment according to claim 31, further comprising the step of:

determining whether a future number of bales that the agricultural bale equipment can receive and accumulate before the agricultural bale equipment reaches the next predetermined bale discharge zone is greater than a remaining number of bales that the agricultural bale equipment can receive and accumulate before reaching the predetermined bale accumulating capacity of the agricultural bale equipment responsive to determining that the present number of bales received and accumulated on the agricultural bale equipment is less than the predetermined bale accumulating capacity of the agricultural bale equipment but prior to the step of discharging the present number of bales received and accumulated on the agricultural bale equipment from the agricultural bale equipment to the ground surface in or near the at least one predetermined bale discharge zone.

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35. (New) A method for operating agricultural bale equipment according to claim 34, wherein the step of determining whether the future number of bales that the agricultural bale equipment can receive and accumulate before the agricultural bale equipment reaches the next predetermined bale discharge zone is greater than the remaining number of bales that the agricultural bale equipment can receive and accumulate before reaching the predetermined bale accumulating capacity of the agricultural bale equipment further comprises the steps of:

subtracting the present number of bales received and accumulated on the agricultural bale equipment from the predetermined bale accumulating capacity of the agricultural bale equipment to determine the remaining number of bales that the agricultural bale equipment can receive and accumulate before the predetermined bale accumulating capacity of the agricultural bale equipment reaches its maximum limit;

determining a remaining distance between a present location of the agricultural bale equipment in the field and the next predetermined bale discharge zone to be reached by the agricultural bale equipment;

multiplying the average number of bales received and accumulated on the agricultural bale equipment over the distance traveled by the agricultural bale equipment in the field by the remaining distance between a present location of the agricultural bale equipment in the field and the next predetermined bale discharge zone to be reached by the agricultural bale equipment to determine the future number of bales that the agricultural bale equipment can receive and accumulate before the agricultural bale equipment reaches the next predetermined bale discharge zone;

when it is determined that the future number of bales that the agricultural bale equipment can receive and accumulate before the agricultural bale equipment reaches the next predetermined bale discharge zone is greater than a remaining number of bales that the agricultural bale equipment can receive and accumulate before reaching the predetermined bale accumulating capacity of the agricultural bale equipment, then perform the step of:

discharging the present number of bales received and accumulated on the agricultural bale equipment from the agricultural bale equipment to the ground surface in or near the at least one predetermined bale discharge zone;

when it is determined that the future number of bales that the agricultural bale equipment can receive and accumulate before the agricultural bale equipment reaches the next predetermined bale discharge zone is not greater than a remaining number of bales that the agricultural bale equipment can receive and accumulate before reaching the predetermined bale accumulating capacity of the agricultural bale equipment, then continuing to perform the step of:

receiving and accumulating the plurality of bales on the agricultural bale equipment.

36. (New) A system for harvesting agricultural crop in a field, comprising:
- a harvest monitoring system adapted to generate harvested agricultural crop level information responsive to monitoring an amount of the agricultural crop harvested by a first agricultural machine in the field;
  - a location determining system adapted to generate field location information responsive to determining a plurality of locations of the first agricultural machine in the field; and
  - a control system for determining an anticipated time that the harvested agricultural crop would reach a desired level on the first agricultural machine responsive to receiving the harvested crop level information, and for determining an anticipated location of the first agricultural machine in the field at the anticipated time responsive to receiving the field location information.
37. (New) A system according to claim 36 further comprising:
- a memory unit adapted to store field map information representing a map of the field, wherein control system further determines the anticipated location of the first agricultural machine in the field at the anticipated time responsive to receiving the field map information.
38. (New) A system according to claim 37, wherein the memory unit is adapted to update the field map information responsive to receiving the field location information.
39. (New) A system according to claim 37, wherein the memory unit is carried by the first agricultural machine.
40. (New) A system according to claim 37, wherein the memory unit is located remote from the first agricultural machine.
41. (New) A system according to claim 36 further comprising:
- an operator display, carried by the first agricultural machine, adapted to display field map information, representing a map of the field, and adapted to display at least one of the plurality of locations of the first agricultural machine in the field.

42. (New) A system according to claim 36, wherein the location determining system further comprises:  
a global positioning system (GPS) receiver system.
43. (New) A system according to claim 36, wherein the field location information further comprises:  
location, speed, and heading of the first agricultural machine in the field.
44. (New) A system according to claim 36, wherein the control system is located remote from the first agricultural machine, and wherein the control system is adapted to receive the harvested agricultural crop level information and the field location information over a radio frequency communication channel.
45. (New) A system according to claim 36, wherein the first agricultural machine further comprises:  
a harvester.
46. (New) A system according to claim 45, wherein the harvester further comprises:  
an agricultural baler.
47. (New) A system according to claim 45, wherein the harvester further comprises:  
an agricultural baler adapted to pull an agricultural bale accumulator.
48. (New) A system according to claim 45, wherein the harvester further comprises:  
an agricultural grain harvester.
49. (New) A system according to claim 36 further comprising:  
a second agricultural machine adapted to haul the harvested agricultural crop discharged from the first agricultural machine.
50. (New) A system according to claim 49, wherein second agricultural machine further comprises:  
a loader.

51. (New) A system according to claim 49, wherein second agricultural machine further comprises:  
a semi trailer.

52. (New) A method for harvesting agricultural crop in a field, comprising the steps of:  
determining an anticipated time that harvested agricultural crop would reach a desired level on a first agricultural machine; and  
determining an anticipated location of the first agricultural machine in the field at the anticipated time.
53. (New) A method according to claim 52 further comprising the steps of:  
generating harvested agricultural crop level information responsive to monitoring an amount of the agricultural crop harvested by the first agricultural machine in the field,  
wherein the step of determining the anticipated time that the harvested agricultural crop would reach the desired level on the first agricultural machine is responsive to receiving the harvested crop level information; and  
generating field location information responsive to determining a plurality of locations of the first agricultural machine in the field,  
wherein the step of determining the anticipated location of the first agricultural machine in the field at the anticipated time is responsive to receiving the field location information.
54. (New) A method according to claim 52 further comprising the step of:  
determining the anticipated location of the first agricultural machine in the field at the anticipated time responsive to receiving field map information, representing a map of the field.
55. (New) A method according to claim 52 further comprising the step of:  
displaying on an operator display at least a portion of field map information, representing a map of the field, and at least one of the plurality of locations of the first agricultural machine in the field.
56. (New) A method according to claim 52 further comprising the step of:  
updating field map information, representing a map of the field, responsive to receiving the field location information.
57. (New) A method according to claim 52, wherein the step of generating field location information further comprises the step of:

generating position, speed, and heading information associated with the first agricultural machine.

58. (New) A method according to claim 52, further comprising the step of:  
discharging the harvested agricultural crop from the first agricultural machine.
59. (New) A method according to claim 58, further comprising the step of:  
hauling the harvested agricultural crop by a second agricultural machine responsive to the harvested agricultural crop being discharged from the first agricultural machine.

60. (New) A system for harvesting agricultural crop in a field, comprising:
- means for generating harvested agricultural crop level information responsive to monitoring an amount of the agricultural crop harvested by a first agricultural machine in the field;
  - means for determining an anticipated time that the harvested agricultural crop would reach a desired level on the first agricultural machine responsive to receiving the harvested crop level information;
  - means for generating field location information responsive to determining a plurality of locations of the first agricultural machine in the field; and
  - means for determining an anticipated location of the first agricultural machine in the field at the anticipated time responsive to receiving the field location information.